



Energy Control Procedures Lockout/Tagout 29 CFR 1910.147

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What is covered?

- ◆ Servicing and maintenance
- ◆ Normal production operations where:
 - Employees by-pass guard(s)
 - Employees place any part of their body in a hazardous area



What is not covered?

- ◆ Construction, agriculture, and maritime
- ◆ Normal production operations (subpart O)
- ◆ Cord-and-plug under the control of employee (written procedure still required)
- ◆ Exposure to electrical conductors (subpart S and electrical safety-related work practices)



Energy types

- ◆ Electrical
- ◆ Mechanical
- ◆ Hydraulic
- ◆ Pneumatic
- ◆ Chemical
- ◆ Thermal
- ◆ Other



Lockout vs. Tagout

- ◆ If capable of being locked out:
 - Prefer lockout
 - Tags allowed, if employer can demonstrate FULL EMPLOYEE PROTECTION
- ◆ Machine Modifications



Full employee protection?

- ◆ Tags attached at the same location as locks
- ◆ Full compliance with all tagout provisions in 29 CFR 1910.147
- ◆ Additional means when necessary (e.g. removal of a valve handle)



Definitions

- ◆ Affected employee
- ◆ Authorized employee
- ◆ Capable of being locked out
- ◆ Energy isolating device
- ◆ Servicing and/or maintenance





Servicing and maintenance includes:

- ◆ Setting up
- ◆ Adjusting
- ◆ Inspecting
- ◆ Modifying
- ◆ Installing

Lockout/tagout requirements

- ◆ Written program which includes specific written procedures
- ◆ Training of employees (not just maintenance!)
- ◆ Periodic review of procedures





Written lockout/tagout procedure

- ◆ Clearly and specifically outline
 - Scope
 - Purpose
 - Authorization
 - Rules, techniques for control of energy




Lockout procedure (cont.)

- ◆ Clearly and specifically outline:

- Means to enforce compliance including:

- Intended use of procedure
 - Specific procedural steps
 - Specific testing requirements



Documentation exceptions:

- ◆ Machine has no potential for stored energy
- ◆ Machine has a single energy source
- ◆ Isolation of that source will completely de-energize
- ◆ Machine is isolated and locked out during maintenance




Documentation exceptions (cont.)

- ◆ A single lockout device will achieve locked-out condition
- ◆ Lockout device under exclusive control of employee
- ◆ Maintenance does not create hazard to others
- ◆ No previous accidents involving unexpected energization on this equipment



Energy control procedure



- ◆ Notification of employees
- ◆ Preparation for shutdown
- ◆ Machine or equipment shutdown
- ◆ Machine or equipment isolation
- ◆ Lockout/tagout device application
- ◆ Stored energy
- ◆ Verification of isolation
- ◆ Release from lockout/tagout



Lockout procedure – Step 1


◆ NOTIFICATION OF EMPLOYEES

- Before controls are applied, and before they are removed



Lockout procedure – Step 2


- ◆ PREPARATION FOR SHUTDOWN
 - Knowledge of the type and magnitude of energy and methods to control energy



Lockout procedure – Step 3

◆ MACHINE OR EQUIPMENT SHUTDOWN

- Orderly shutdown to avoid increased hazard



Lockout procedure – Step 4

◆ MACHINE OR EQUIPMENT ISOLATION

- All energy isolation devices located and operated to isolate machine



Line breaking:

Means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury




Line blanking or blinding:

Means the absolute closure of a pipe, line, or duct by fastening of a solid plate that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.





Double block and bleed:

Means the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.



Lockout procedure – Step 5

- ◆ LOCKOUT OR TAGOUT DEVICE APPLICATION
 - Affixed by authorized employee holding energy isolating device in the safe or off position



Lockout procedure – Step 6


◆ STORED ENERGY

- Relieve all stored energy and continue to verify if there is a chance of re-accumulation



Stored energy examples


- ◆ Batteries and capacitors
- ◆ Pressure differential
 - Hydraulic
 - Pneumatic
 - Vacuum
- ◆ Springs
- ◆ Gravity



Lockout procedure – Step 7

◆ VERIFICATION OF ISOLATION



- Prior to servicing or maintenance, authorized employee must verify machine has been de-energized



Lockout procedure – Step 8

◆ RELEASE FROM LOCKOUT OR TAGOUT

- Inspect work area to ensure removal of non-essentials
- Employees safely positioned and notified
- Lockout/tagout removal (by employee who applied)



Lock/tag removal if authorized employee is not available?

- ◆ Verify that authorized employee is not at facility
- ◆ Make reasonable efforts to inform him or her
- ◆ Ensure that he/she knows of removal upon re-entering

**MUST INCLUDE THIS PROCEDURE IN
WRITTEN PROGRAM**



Hardware requirements

- ◆ Durable
- ◆ Standardized
- ◆ Substantial
- ◆ Identifiable



Hardware must be:

- ◆ Provided by the employer
- ◆ Singularly identified
- ◆ Only devices used for control
- ◆ Not used for other purposes



Hardware must be (cont.):

- ◆ Durable – be able to withstand environment
- ◆ Standardized – color, size, etc.
 - Tags : print and format
- ◆ Substantial – no accidental removal
 - Tag attachment means:
 - Withstand at least 50 pounds of force
 - Not re-usable
 - Self locking
 - Attachable by hand



Hardware must be (cont.):

- ◆ Identifiable – identify the employee who applied

- Tags must include legend such as DO NOT START




Periodic Inspection

- ◆ Performed at least annually
- ◆ Lockout – include review with authorized employees
- ◆ Tagout – include review with authorized and affected employees
- ◆ Certification record kept:
 - Identify machine or equipment
 - Date of inspection
 - Employees performing and included in inspection



Training and re-training

- ◆ Authorized employees
 - Recognition of hazardous energy
 - Type and magnitude of hazardous energy
 - Methods of isolating energy
 - How to verify isolation
- ◆ Affected – Purpose and use of procedure
- ◆ Other – Procedure and Prohibition from tampering
- ◆ Tagout provisions



Re-training is required when:

- ◆ Change in job assignment
- ◆ Change in machine or process
- ◆ Change in lockout/tagout procedure
- ◆ Inadequacies revealed in periodic review



Training certification

- ◆ Certify that the training has been conducted and kept up to date:
 - Employee names
 - Date(s) of training



Other requirements

- ◆ Contractors?
- ◆ Personnel or shift changes?



Testing or positioning machines

- ◆ Clear the machine of tools and materials
- ◆ Remove employees from the area
- ◆ Remove lockout/tagout devices
- ◆ Energize and proceed with testing/positioning
- ◆ De-energize and re-apply energy control measures



Group lockout

- ◆ Personal lock or tag (usually)
- ◆ Lockbox or master tag system with principal authorized employee

“Shall utilize a procedure which affords a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device”



TRAINING

- ◆ General
 - Operation
 - Steps to:
 - Change
 - Set up
 - Clean
- ◆ Second Nature
- ◆ Feedback from Employees



Training (cont.)

- ◆ Lockout/Tagout
 - Consistent Application
 - Who's Injured



Training (cont.)

◆ Inspections

- Hazard Assessment (Training of Operators)
- Incorrect Procedures (Training of Supervisors)

◆ Documentation

- Training
- Retraining



Minor Servicing Exemption

- ◆ Activities which are routine, repetitive, and integral to the use of the equipment for production are not covered by this standard if alternative measures provide effective protection.
- ◆ Activity must be conducted during normal production operations
- ◆ Activity must be **routine** (regular course of procedure in accordance with established practices), **repetitive** (regularly repeated as part of production), and **integral** (essential to the production process).



SUMMARY

- ◆ Written program including written procedures for each machine
- ◆ Training of employees
- ◆ Periodic review of program
- ◆ ENFORCEMENT